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Progress Report on Superconducting Joint Technique for the Development of MgB₂ MRI magnet

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Currently, we are conducting a collaborative R&D project to manufacture long MgB₂ wires with a high critical current density, for developing helium-free MRI superconducting magnets, which is supported by the Materials and Components Technology Development Program of the Korean Evaluation Institute of Industrial Technology (KEIT), Korea. Herein, we report our progress on the superconducting joint technique for the development of an MgB₂ MRI magnet as part of a collaborative R&D program. The superconducting joint was achieved by employing an in-situ process using Mg and B powders with unreacted/monofilament MgB₂ wires manufactured by Kiswire Advanced Technology Co. Ltd. The joint process was optimized by the appropriate selection of the optimal joining parameters such as the packing pressure of MgB₂ powder, heat-treatment temperatures, and duration times. In addition, the morphologies and structures of the joint samples were analyzed using scanning electron microscopy (SEM) and x-ray diffraction (XRD), respectively. Acknowledgement: This work was supported by the Materials and Components Technology Development Program of KEIT [10053590, Development of MgB₂ wire and coil with a high critical current and long length for superconducting medical•electric power equipment].

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